

PROCEEDINGS
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TWO NEW WORMFISHES (GOBIOIDEA:
MICRODESMIDAE) FROM THE INDIAN OCEAN

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Among fishes I have examined in connection with current studies for a revision of the gobioid family Microdesmidae, are two undescribed species from the Seychelles and Maldivé Islands. Since each of these species contributes significantly to our knowledge of the characteristics, species diversity and distribution of the Indo-Pacific genus *Gunnellichthys* Bleeker, I have decided to publish their descriptions at this time. *Gunnellichthys* is widely distributed and locally abundant in tidepool and reef habitats from Mozambique eastward to Fiji and, questionably, the Line Islands. Generic characters were most recently discussed by Schultz (1966) and although his observations are, at best, incomplete, I propose to delay generic diagnosis and description until I have had access to additional study material.

Specimens reported here were obtained during the International Indian Ocean Expedition and have been deposited in the collections of the Academy of Natural Sciences of Philadelphia (ANSP), the Field Museum of Natural History (FMNH) and the Gulf Coast Research Laboratory (GCRL). Head length is measured from tip of lower jaw to base of uppermost pectoral ray; body depth measured at anal fin origin; caudal fin length as distance between posterior margin of hypural vertebra and tip of longest caudal ray. Measurements are in millimeters (mm); proportions are shown as percentages of standard length (SL) or head length (HL).

Appreciation is expressed to Dr. James E. Böhlke and Loren

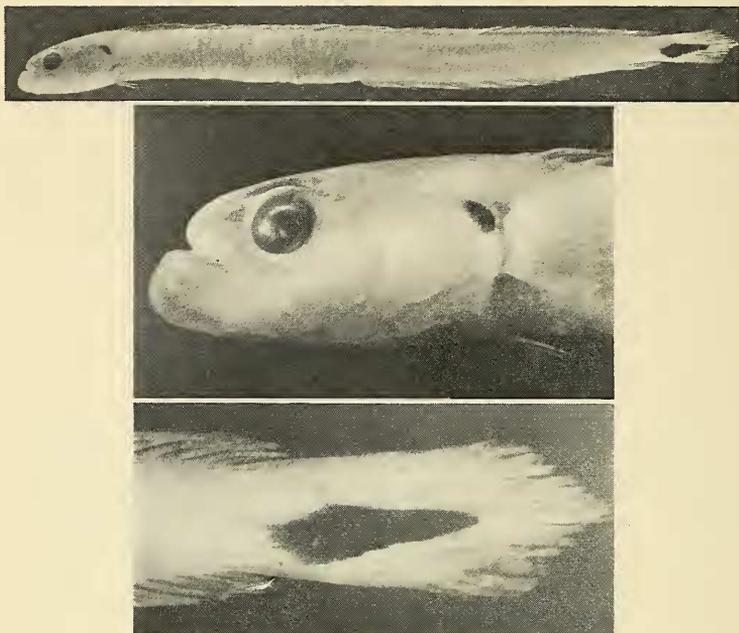


FIG. 1. *Gunnellichthys curiosus* ANSP 103611; holotype; 79.4 mm SL.

P. Woods for making this material available for study. Acknowledgment is also made to Drs. Reeve M. Bailey and C. Richard Robins for their critical comments on the manuscript. Semidiagrammatic delineations are by Harry L. Moore, Jr.

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***Gunnellichthys curiosus* new species**

(Fig. 1)

Holotype: ANSP 103611; 79.4 mm SL; Curieuse Island, Seychelles, just SE of point forming south end of Laraie Bay (Admiralty Chart no. 1072); from a depth of about 30 ft over sand and coral bottom; 23 February 1964; Sta. F-64, International Indian Ocean Expedition, Seychelles Islands Program; James E. Böhlke *et al.* coll. This is the only known specimen.

Diagnosis: A species of *Gunnellichthys* with short pelvic fins; lower jaw with distinct, horizontally broad, lip; snout and lower jaw not conspicuously narrowed at symphysis; close set to narrowly imbricate

scales over most of body and head; snout and lower jaw clothed with microscopic villi; three anteriormost dorsal spines more closely spaced than successors; with several, prominent, long subvertical rows of papillae on sides between anal fin origin and pectoral fin insertion; opercle with dark spot; dark blotch on caudal fin base extending onto proximal caudal fin; anterior dorsal fin with narrow brown to dusky marginal stripe, a second stripe, or series of interradiial blotches, below; body with a pale midlateral longitudinal stripe; proximal pterygiophores of 1st two dorsal spines inserted over interspace between 2nd and 3rd neural spines; prezygapophyses low, not distinctly elevated.

Description: Dorsal spines 20, dorsal segmented rays 42, total dorsal elements 62; anal rays 39; pectoral rays 15; pelvic fin I, 4; principal caudal rays 15; vertebrae $26 + 32 = 58$.

Measurements (mm) are followed by percent SL or HL in parentheses. Caudal fin length 7.8 (9.8); least depth of caudal peduncle 2.7 (3.4); body depth at anal fin origin 5.7 (7.2); predorsal length to tip of lower jaw 13.2 (16.6); preanal length 41.6 (52.4); pectoral fin length 5.3 (6.7); pelvic fin length 2.6 (3.3); distance from pelvic insertion to anal fin origin 29.1 (36.6); head length 12.1 (15.2). Diameter of fleshy orbit 2.0 (16.5); distance from anterior margin of eye to tip of lower jaw 4.0 (33.1); snout length 2.0 (16.5); postorbital length 6.1 (50.4); tip of lower jaw to angle of gape 4.3 (35.5).

Body moderately elongate, tapering to slightly less than half body depth at caudal peduncle; compressed, greatest breadth (7.6 percent SL) at opercle, breadth at anal fin origin 3.4 percent SL; caudal fin long, obtusely angular, middle rays longest; head depth subequal to body depth; interorbital broad, about $\frac{2}{3}$ eye diameter, laterally and longitudinally convex; head curves evenly to snout tip without distinct postorbital depression; eye prominent, lateral, diameter subequal to snout length; lower jaw prominent, extends about eye diameter in advance of snout tip; jaws and snout broadly rounded, not conspicuously narrowed at symphysis; gape moderate, extends slightly past anterior margin of eye, not strongly inclined; lips prominent, moderately thick and fleshy, upper extends forward to below vertical from anterior naris, narrowed and concealed in front by overhanging snout; lower jaw with horizontally flattened lip crossing symphysis and expanded laterally into moderately broad folds (this is a prominent and distinctive feature in both dorsal and lateral aspect); anterior naris opens anterolaterally through short, delicately flared, tubule located dorsoanterolaterally on snout margin; posterior naris dorsolateral over preorbital and about $\frac{1}{3}$ snout length in advance of anterior margin of orbit; naris margin slightly elevated but not distinctly tubiform; nares subequal in diameter, about 12 in eye; jaws with outer series of large, separated, caniniform teeth in front, with smaller close-set or contiguous, pointed teeth extending laterally to near posterior angle of gape, apparently with two or more inner series of close-set, pointed teeth in front; (dentition could not be clearly seen without damage to specimen; inner margin of lower lip plicate, but

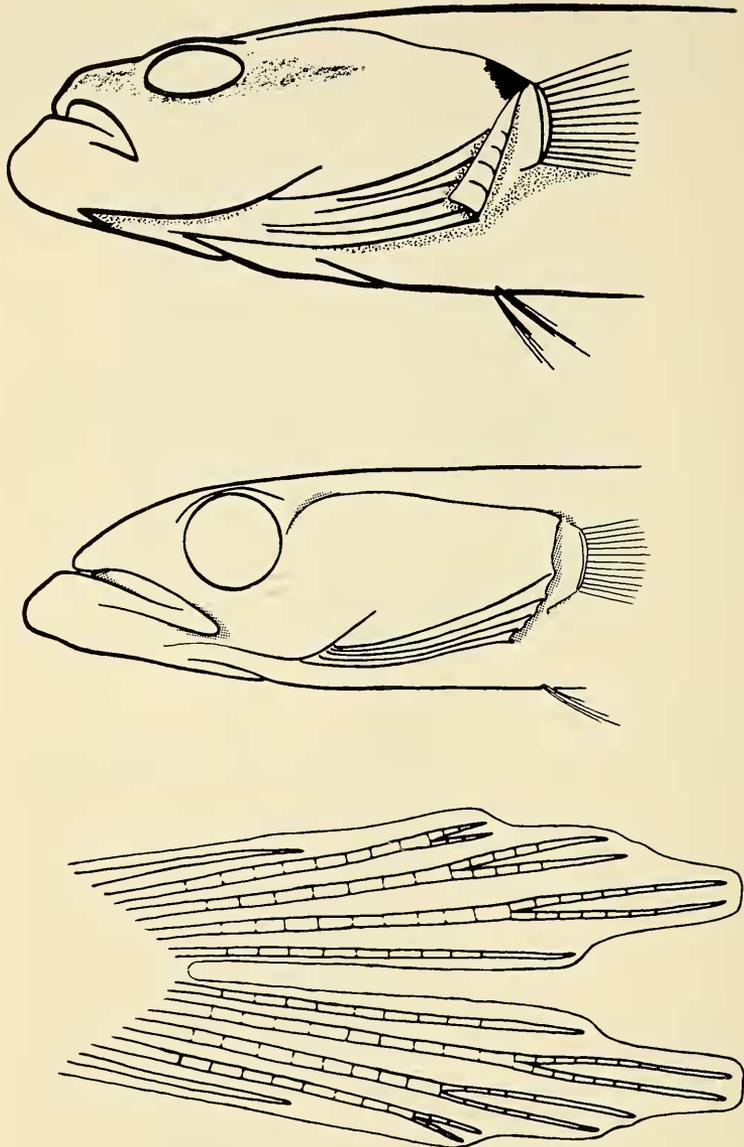


FIG. 2. Semidiagrammatic delineations of gill openings and pelvic fins. Anterior dorsal fin elements omitted. Upper: *Gunnellichthys curiosus*. Middle: *Gunnellichthys viridescens*. Lower: *Gunnellichthys curiosus*.

presence or absence of labial teeth is not yet confirmed); tongue thick, round in front.

Gill opening (Fig. 2) moderate, its diagonal about half again as long as pectoral fin base, slitlike, not tubiform, originating just below upper angle of pectoral fin base and slightly in advance of insertion of uppermost pectoral ray, margin continuing almost vertically downward across pectoral base then anteriorly as free flap of branchiostegal membrane to unite ventrolaterally with isthmus in advance of pelvic fin insertion, distance from lower pectoral angle to ventral terminus of gill opening equivalent to $\frac{2}{3}$ length of pectoral fin base; pectoral peduncle largely concealed beneath opercle and gill membranes; median fins terminate on anterior caudal peduncle, completely free from caudal fin, depressed tips of posterior rays fail to reach posterior margin of hypural, extend to 2nd or 3rd spinniform caudal fin element; dorsal fin origin above anterior third of pectoral fin, little more than $\frac{1}{2}$ eye diameter behind vertical from upper angle of gill opening, first two spines about 30 percent shorter than successors; interspace between first 2 dorsal spines narrow, interspace between 2nd and 3rd somewhat greater, but less than that between 3rd and 4th, which is subequal to remaining interspaces (ratios of first three interspaces approximate 1:1.5:2), 11 anterior rays simple, subsequent rays branched; 1st anal fin element segmented and finely branched at tip, remaining rays, except last two, well branched; last two dorsal and anal fin rays simple, more closely spaced than those preceding, bases separate; caudal fin formula $7 + 2 + 11 + 2 + 7$ (counts of procurrent elements from radiograph); pectoral fins rounded, left $2 + 12 + 1$, right $2 + 11 + 2$, 6th-7th rays longest; pelvic fins (Fig. 2) inserted distinctly in advance of pectoral fins, separate, innermost ray simple, shorter than next, which is both branched and longest, 3rd and 4th rays progressively shorter, branched, outer spine shorter and slender; anal fin origin beneath interspace between 25th and 26th dorsal fin elements.

Head covered with close-set to locally imbricate scales from nape forward to just anteriorly of posterior nares; preorbital, suborbital, entire cheek and opercle similarly scaled to ventral margins; scales narrowly impinge periphery of eye; narrow band of scales on mandible below lateral expansion of lower lip, lower jaw apparently naked elsewhere; non-imbricate scales close-set on posterior $\frac{2}{3}$ of branchiostegal membrane, anterior membrane and remainder of ventral head naked. Body squamation similar, maximum scale diameter about 0.25 mm, everywhere close-set to locally imbricate, not widely separated; squamation complete over predorsal, chest, abdomen and lateral body except in immediate vicinity of anal and genital openings; scales on pelvic fin base; subtriangular scale patch extends over proximal half of caudal fin; scales on pectoral fin base extend well into gill opening. Snout, upper preorbital, lower jaw and much of anterior ventral portion of head densely covered with microscopic hyaline villi; under low magnification these regions appear to be pubescent.

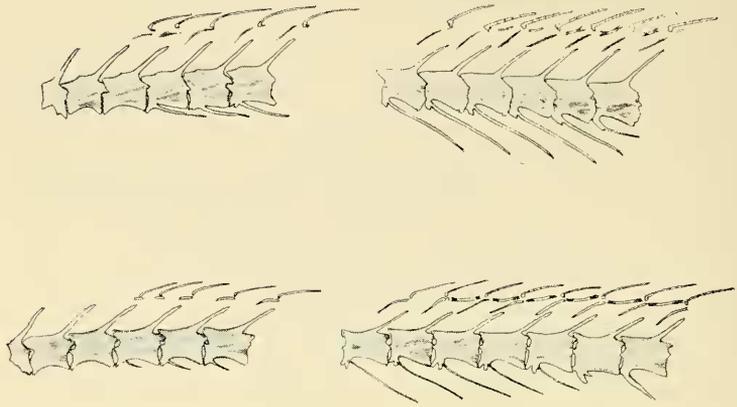


FIG. 3. Semidiagrammatic delineation. *Left*—Anterior abdominal vertebrae showing dorsal spines and proximal pterygiophores. *Right*—Last abdominal and anterior caudal vertebrae together with the last dorsal spine, anterior segmented rays, proximal and distal pterygiophores. Upper: *Gunnellichthys curiosus*. Lower: *Gunnellichthys viridescens*.

A series of papillae crosses nape, another crosses interorbital to unite with a series that follows dorsal orbital margin and runs forward to snout tip, this latter series is paralleled by a short series near snout midline and by another longitudinal series along outer margins of nares; a series runs from anterior naris ventrad across preorbital and closely follows anteroventral orbital margin; one or two vertical series on cheek; a vertical series extends from near upper opercular angle to near predorsal midline; two parallel series originate below angle of gape, pass anterolaterally along lateral midline of lower jaw and across symphysis; a ventrolateral series from near lower pectoral angle to just posteriad of pelvic fin insertion; 8 or 9 long subvertical rows on lateral body between pectoral axil and anal fin origin, originating on upper half of body and extending to near ventral midline; sensory papillae indistinct or obsolete posteriad of anal fin origin.

No predorsal interneurals. Proximal pterygiophores of first two dorsal spines (Fig. 3) somewhat flattened, subhorizontal, without distinct descending process, inserted over interspace between 2nd and 3rd neural spines; proximal pterygiophore of 3rd dorsal spine with indistinct (in radiograph) poorly ossified descending process inserted between 3rd and 4th neural spines; subsequent proximal pterygiophores better ossified, progressively more spinelike and each inserted between succeeding neural spines. Distal pterygiophores begin immediately behind 1st segmented dorsal ray and after 2nd anal ray; no supplemental proximal pterygio-

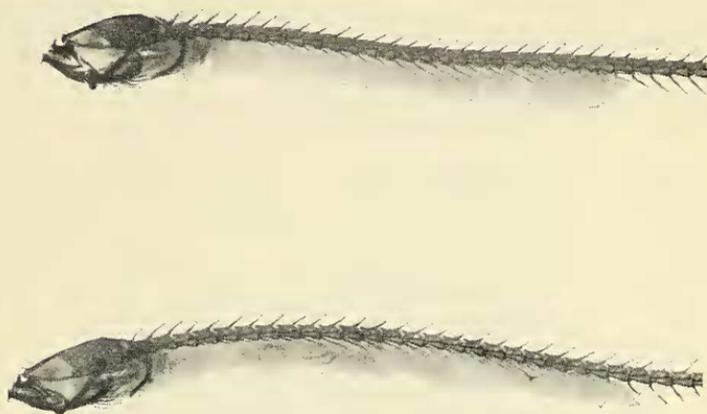


FIG. 4. Radiograph of anterior body showing head, axial skeleton and abdominal ribs. Upper: *Gunnellichthys curiosus*. ANSP 103611; holotype. Lower: *Gunnellichthys viridescens*. ANSP 103624; holotype.

phore between last dorsal spine and 1st ray. Abdominal neural spines strong, slender, sharply pointed, of subequal length, each located posteriad on centrum; prezygapophyses short, depressed in front, not dorsally elevated; ribs apparently articulate with centra of first three vertebrae, with parapophyses on remaining abdominal vertebrae; anterior ribs short, those of 4th vertebrae about $\frac{1}{3}$ longer than centrum, lengthening posteriad until about thrice vertebral length at 19th or 20th vertebra; ribs mostly at attitude of 45° ; abdominal epipleurals distinct, subequal to vertebral length or slightly shorter, caudal epipleurals not visible in radiograph; skull (Fig. 4) elongate, not strongly elevated in front. Frontals well ossified, reaching mesethmoid. Premaxillary pedicel strong, blunt, not abruptly angled posteriad at tip. Posttemporals distinctly elevated above anterior vertebrae. Pectoral radials 4. Branchiostegal rays 5, innermost remote from next. Ceratohyal broadened posteriorly. Dentary strong, with short, pointed terminal ventral process.

Ground color in alcohol, light tan; eye with black iris and gray-black pupil; dark brown blotch, about $\frac{2}{3}$ eye diameter, on upper margin of

opercle and lateral head (Fig. 1) its center about even with upper pectoral angle; larger elongate lateral blotch on posterior caudal peduncle and proximal half of caudal fin, ventrally expanded to near base of lowermost segmented ray, terminating dorsally at 4th branched caudal ray; dorsal fin with a narrow brown stripe extending posteriad to about 23rd ray, edging fin anteriorly, it is surmounted by narrow hyaline band behind; first 7 dorsal spines and interradial membranes dusky brown, subsequent dorsal elements lighter but at least partly delineated by minute brown melanophores; each interradial membrane from 7th spine to about 20th ray with conspicuous longitudinally elongate blotch, wider than marginal stripe and separated above and below by immaculate membrane; although interrupted by fin supports, blotches appear as median dorsal fin stripe; anterior 25 or 26 anal rays delineated by fine speckling of minute brown melanophores, remaining fin immaculate; body and head shaded with greater or lesser concentrations of minute brown melanophores; predorsal to snout and lateral head to about middle of opercle dusky brown, melanophores less dense below, absent along ventral third of opercle and cheek; lips and lower jaw finely speckled; ventral head and branchiostegal membranes generally immaculate; few scattered melanophores on chest; pelvic fins closely speckled proximally, melanophores scattered toward fin tips; pectoral fin base with rather dense patches of light brown melanophores above and below separated by a narrow immaculate stripe; ventral patch continues into gill opening, remainder of fin immaculate; lateral body from dorsal fin base to midline dusky, somewhat lighter than head, finely speckled from dorsal fin origin to caudal fin base; a generally immaculate stripe, bounded dorsally by midline, extends from pectoral axil to caudal fin base, stripe broad under pectoral fin, narrower along middle body, expanded over entire lower half of body posterior to 26th anal ray, scattered melanophores intrude stripe between pectoral tip and anal fin origin; remainder of lower sides and the ventral abdomen dusky; scales on upper head, upper body and medially on ventral abdomen are posteriorly margined with brown, scales elsewhere usually without margination.

Etymology: The specific name refers to the curious body coloration and the unusual pubescence of the anterior head.

Relationships: This species may be distinguished from *Gunnellichthys pleurotaenia* Bleeker and *G. copleyi* J. L. B. Smith by its close-set to imbricate squamation, its thick and flat, rather than thin and undifferentiated lower lip, its obtusely angular, rather than rounded or truncate, caudal fin, striking differences in coloration, including its lack of a continuous dark lateral stripe and by differences in proportions, counts and skeletal characters. *G. curiosus* agrees with these species in having short pelvic fins, a broad anterior head configuration and a similar spacing of the anterior dorsal spines. It is readily separated from *G. irideus* J. L. B. Smith by its distinctive coloration, the rounded, rather than narrow, snout and lower jaw, squamation and short pelvic fins. Coloration of *curiosus* is superficially similar to that of *G. monostigma*

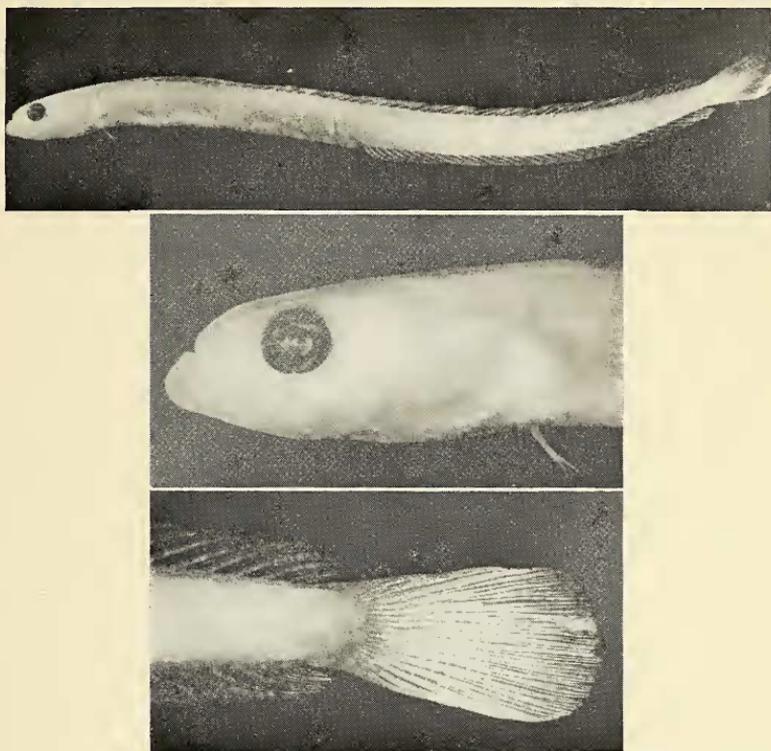


FIG. 5. *Gunnellichthys viridescens*. ANSP 103624; holotype; 53.6 mm SL.

J. L. B. Smith but the latter lacks the striped dorsal fin, the immaculate lateral stripe and the large caudal blotch. Anterior dorsal spines are regularly spaced in *monostigma*, the head is conspicuously narrowed in front, scales are separated and there are differences in counts, proportions and skeletal characters. *Gunnellichthys curiosus* appears to be most closely related to *G. pleurotaenia* and *G. copleyi*.

***Gunnellichthys viridescens* new species**
(Fig. 5)

Holotype: ANSP 103624; 53.6 mm SL; Seychelles, W. of NW tip of Anonyme Island, between Anonyme and Mahé islands (Admiralty Chart no. 1072); at depth of 35–50 ft; 11 February 1964; Sta. F-44, International Indian Ocean Expedition, Seychelles Islands Program; James E. Böhlke *et al.* coll.

Paratypes: ANSP 103625; (7) 35–53 mm SL; other data as for holotype. ANSP 109202; 50 mm SL; cleared and stained; other data as for

TABLE 1. Measurements of *Gunnellichthys viridescens*.¹

	Holotype		Paratypes		$\bar{X}\%$
	mm	%	N	Range (mm)	
Standard length	53.6		14	29.8-64.4	
Caudal fin length	4.9	9.1	12	3.2- 6.2	9.4
Least caudal peduncle depth	1.6	2.9	12	0.9- 2.0	2.9
Body depth at anal fin origin	3.0	5.6	12	1.8- 3.7	5.5
Predorsal length (to tip of lower jaw)	8.7	16.2	12	5.4-10.4	16.6
Preanal length	27.3	50.9	12	15.6-32.6	51.0
Pectoral fin length	3.6	6.7	12	2.1- 4.3	6.6
Pelvic fin length	1.4	2.6	12	1.0- 2.2	3.0
Pelvic insertion to anal fin origin	19.9	37.1	12	10.6-23.0	36.6
Head length	7.4	13.8	11	4.8- 9.7	14.8
Diameter of fleshy orbit	1.4	18.9 ¹	11	1.1- 1.6	19.3
Anterior margin of eye to tip of lower jaw	2.0	27.0	10	1.5- 2.7	26.9
Snout length	1.4	18.9	8	0.9- 1.7	17.8
Postorbital length	4.0	54.0	10	3.2- 5.4	54.1
Fleshy interorbital width	0.8	10.8	10	0.5- 1.1	9.6
Tip of lower jaw to angle of gape	2.6	35.1	10	1.7- 3.5	32.6

¹ From caudal fin length through head length percentages are of standard length; remaining percentages are of head length.

holotype. GCRL V67:2186; 53 mm SL; other data as for holotype. ANSP 103609; 51 mm SL; Mahé Island, Seychelles, SW of Souris Island; coral sand and boulder bottom at depth of about 7 ft; 31 January 1964; Sta. F-13, International Indian Ocean Expedition, Seychelles Islands Program. ANSP 103612; (3) 30-40 mm SL; Mahé Island, Beau Vallon Bay, NNW of Hotel des Seychelles; from isolated patch of rock, coral and sponge at a depth of 40-50 ft; 19 March 1964; Sta. F-119, International Indian Ocean Expedition, Seychelles Islands Program. FMNH 73909; 64.4 mm SL; Bushy Island, Addu Atoll, Maldives; from coral and sand bottom at a depth of 2-8 ft; 10 May 1964; International Indian Ocean Expedition; L. P. Woods and D. L. Ray coll.

Diagnosis: A species of *Gunnellichthys* with short pelvic fins; lower jaw with distinct horizontal expansion across symphysis; snout and lower jaw not conspicuously narrowed in front; scales separate, non-imbricate; snout, lower jaw and much of ventral head with blunt, microscopic, papillae; four anteriormost dorsal spines more closely spaced than successors; without prominent subvertical rows of lateral abdominal sensory papillae; without conspicuous color markings but with faint, dark, median stripe on anterior dorsal fin, pale lateral stripe, becoming slightly darkened anteriorly with increase in size, margined dorsally by fine dark line and an indistinct dusky median dorsal shading from snout posteriad to caudal peduncle along each side of dorsal fin base; proximal pterygiophores of first two dorsal spines inserted over interspace between 2nd and 3rd neural spines; anterior caudal prezygopophyses, subtriangular, elevated.

TABLE. 2 Counts of *Gunnellichthys viridescens*.

	Holotype	N	Paratypes Range
Number of dorsal spines	21	15	20-21
Number of segmented dorsal rays	38 ¹	15	38-41
Total dorsal elements	59	15	59-61
Number of anal rays	37	15	36-40
Anal fin origin beneath interspace between dorsal elements	24/25	14	24/25-25/26

¹ The last two rays of dorsal and anal fins are counted separately.

Description: Dorsal spines 20-21, dorsal segmented rays 38-41, total dorsal elements 59-61; anal rays 36-40, pectoral rays 12-13; pelvic fin I, 4; principal caudal rays 15; vertebrae 24-25 + 33-34 = 57-59. See Tables 1 and 2 for proportional measurements and counts.

Body moderately elongate, slender, depth at anal fin origin averages 5.4 percent SL, tapering to about 3 percent SL at caudal peduncle; compressed, breadth at anal fin origin 2.6-3.7 percent SL, greatest breadth (5.0 percent SL in holotype) at opercle; caudal fin rounded, averages 9.4 percent SL; head 13.8-16.2 percent SL, its depth subequal to body depth; interorbital moderately convex, width about $\frac{1}{2}$ eye diameter, with prominent, lateral, fleshy supraorbital ridges; head curves evenly to snout tip without distinct postorbital depression; eye lateral, diameter, averaging 19.3 percent head length, equal to or somewhat greater than snout length; snout and lower jaw rounded, not conspicuously narrowed at symphysis; gape moderate, extends (in holotype) just posteriad of vertical from anterior margin of pupil, not strongly inclined; lips not prominent, not conspicuously enlarged or fleshy; upper lip generally narrow throughout, laterally exposed to near vertical from anterior naris where lip is further narrowed and concealed across symphysis by overhanging snout; lower lip somewhat horizontally flattened across symphysis, undifferentiated anterolaterally and across symphysis, with little posterolateral expansion; anterior naris minute, opens anterolaterally through short simple tubule on dorsoanterolateral snout margin; posterior naris dorsolateral over preorbital about $\frac{1}{4}$ snout length in advance of anterior orbital margin, with short simple tubule; diameter of anterior naris $\frac{1}{3}$ to $\frac{1}{2}$ diameter of posterior naris which is about 14 in eye diameter. Lower jaw with outer row of 3 or 4 enlarged, bluntly pointed, slightly recurved, separated caniniform teeth on each side of symphysis (anteriormost smallest) followed by 12-15 smaller, more closely spaced, conical teeth, which decrease in size posteriad; jaw anteriorly with 2 irregular inner series of smaller, slightly recurved, pointed teeth, middle row becoming laterally obsolete; posterior $\frac{3}{4}$ of dentary with biserial, or terminally, uniserial dentition; upper jaw teeth similar to lower jaw teeth, anterior caniniformes somewhat larger, slightly protruding; inner margin of lower lip plicate, apparently with

5 minute triangular teeth, one at symphysis between anteriormost caniniform teeth, two on each side between bases of 1st three or four enlarged teeth (labial teeth visible under $60\times$ magnification in holotype and most paratypes, presence confirmed in cleared specimen); tongue thick and rounded in front.

Gill opening (Fig. 2) moderate, its diagonal about $\frac{1}{3}$ longer than pectoral fin base, slitlike, not tubiform or greatly restricted; origin slightly in advance of upper axil of pectoral peduncle, on level with insertion of upper pectoral ray; margin extends almost vertically downward to a point opposite 8th or 9th pectoral ray, then angles gradually downward and forward, as free fold of branchiostegal membrane, uniting ventrolaterally with isthmus in advance of pelvic fin insertion; distance from lower pectoral axil to anteroventral terminus of gill opening equivalent to $\frac{1}{3}$ length of pectoral fin base; lower angle of gill opening concealed by overhanging fold of branchiostegal membrane; margin of membrane slightly produced at each branchiostegal ray; peduncle of pectoral fin largely exposed, not concealed by opercle and gill membranes. Dorsal and anal fins terminate on anterior caudal peduncle, completely free from caudal fin; depressed tips of posterior rays fail to reach posterior margin of hypural, extend to 3rd or 4th spinniform caudal fin element; dorsal fin origin above anterior $\frac{1}{3}$ of pectoral fin or about $\frac{1}{5}$ eye diameter posteriorly of vertical from upper angle of gill opening; first dorsal spine shortest, subsequent spines gradually increase in length until 5th, which is about twice as long as 1st, remaining spines of subequal length; 1st dorsal ray about $\frac{1}{5}$ longer than last dorsal spine; remaining rays gradually increase in length to about 35th, which is $\frac{1}{3}$ longer than 1st; subsequent rays gradually decrease in length; interspace between first 2 dorsal spines narrow, next two interspaces increasingly longer, but shorter than 4th, which is subequal to remaining interspaces (anterior interspace ratios vary somewhat, those of two paratypes and holotype being 1 : 1.3 : 1.7 : 2.0, 1 : 1.2 : 1.3 : 1.6 and 1 : 1.6 : 2.0 : 2.2); pelvic fins short, inserted in advance of pectoral fin base near vertical from lower axil of pectoral peduncle, separate, innermost pelvic ray shorter than next, which is the longest, 3rd and 4th rays progressively shorter, outer spine short and slender; longest ray of right pelvic fin branched in holotype, 3 outermost rays branched in FMNH 73909, all other pelvic fin rays in type series simple; fin configuration slender but generally similar to that shown in Fig. 2; anal fin origin beneath interspaces between 24th to 26th dorsal fin elements.

Scales inconspicuous, somewhat embedded, well separated, seldom touching and nowhere imbricate; maximum scale diameter about 0.2 mm; head with scattered scales on dorsum from nape forward to posterior orbital margin, interorbital apparently naked except for occasional isolated scales on orbital margin; snout and upper preorbital naked; narrow series of scales on lower preorbital and suborbital from midline of eye to posterior angle of gape, remaining suborbital, cheek and opercle

generally scaled to ventral margins; scattered scales on gill membranes, remainder of ventral head apparently naked. Body squamation generally complete; naked area about anal and genital openings; chest scaled near pelvic fin base but apparently naked elsewhere; caudal peduncle scaled above and below, caudal fin apparently naked; scattered scales on pectoral fin base continue into gill opening. Snout, upper preorbital, lower jaw and much of ventral head with short, blunt, microscopic papillae, without hyaline villi.

Series of larger dermal papillae inconspicuous, difficult to see; a circumorbital series passes closely about eye with anterodorsal branch extending forward to anterior naris; a series follows anterior preorbital margin, terminating near angle of gape; a ventrolateral series along lower jaw from tip to near posterior angle of cheek; a predorsal series continues ventrad on each side to near upper pectoral axils; a few short, longitudinal and subvertical series of 4 to 8 papillae on lateral head above opercle; lateral body with short subvertical series of 3 to 6 widely spaced papillae on myomeric impressions, other long or distinctive series apparently lacking.

No predorsal interneurals. Proximal pterygiophores of first 4 dorsal spines (Fig. 3) flattened, rectangular in lateral aspect, subhorizontal; 4th slightly decurved, 5th and subsequent abdominal proximal dorsal pterygiophores progressively more spinelike with descending processes interdigitating with succeeding neural spines; proximal pterygiophore of 1st dorsal spine inserted slightly posteriad of 3rd neural spine, next pterygiophore over interspace between 3rd and 4th neural spines, 3rd and 4th proximal pterygiophores inserted over 4th and 5th neural spines; distal pterygiophores begin immediately following 1st segmented dorsal ray and after 1st anal ray; no supplementary proximal pterygiophore between last dorsal spine and 1st segmented dorsal ray. Abdominal neural spines strong, slender, sharply pointed, of subequal length and located posteriad on centrum; abdominal prezygopophyses short, little elevated in front; anterior caudal prezygopophyses longer, elevated, subtriangular projections becoming reduced and subhorizontal posteriad of 26th abdominal vertebra; ribs apparently articulate with centra of 1st three vertebrae, with parapophyses on remaining abdominals; anterior ribs about $\frac{1}{3}$ longer than centrum, attain maximum of about twice vertebral length at 15th or 16th vertebra; remaining abdominal ribs of subequal length except for last, which is about $\frac{1}{3}$ longer than vertebra; ribs mostly at an attitude of 45° ; abdominal epipleurals distinct, slightly longer than vertebra; epicentrals, subequal to vertebral length, on caudal vertebrae; skull (Fig. 4) moderately elongate, not strongly elevated in front. Frontals well ossified, reaching mesethmoid. Premaxillary pedicel strong, blunt; tip spatulate in lateral aspect, not abruptly angled posteriad. Posttemporals distinctly elevated above anterior vertebrae. Pectoral radials 4. Branchiostegal rays 5, innermost remote from the next. Ceratohyal broadened posteriorly. Dentary strong, with short, pointed,

well-ossified terminal, ventral process (foregoing observations from cleared and stained paratype and radiographs).

Ground color of holotype in alcohol, yellow-green; without conspicuous markings; eye black with iridescent gray-black pupil. Other color patterns are clearly distinguishable only under magnification. Pale longitudinal stripe, slightly narrower than pupil diameter, originates near posterior orbital margin, interrupted across opercle, continuing posterior to caudal fin base; stripe formed by local reduction of light brownish micromelanophores, which, elsewhere, cover body and head in varying concentrations; stripe margined dorsally by distinctive line of slightly enlarged, darker brown, round melanophores predominately arranged in single longitudinal series; micromelanophores usually separated, with closed centers anteriorly, becoming close-set or touching, most frequently with open centers posterior of anal fin origin. Predorsal area dusky with concentration of brownish melanophores, which continues posterior to caudal peduncle as a narrow dusky basal stripe on both sides of dorsal fin; remainder of body sides and ventral abdomen slightly speckled with pale-brownish melanophores; barlike concentration of melanophores crosses suborbital and cheek broadens posterior to give entire opercle faintly dusky aspect; similar concentration begins on anterior $\frac{1}{3}$ of upper lip, continues forward to symphysis of lower jaw; scattered, darker brown micromelanophores present on peduncle of pectoral fin; caudal, anal and paired fins immaculate; interradiar membranes of anterior dorsal fin with median, longitudinal, concentrations of brownish melanophores, which, together, form a faint stripe; membrane, above and below, as well as entire dorsal fin posterior of vertical from the 3rd or 4th anal fin ray, immaculate. Largest specimen (FMNH 73909) differs in having pale tan melanophores concentrated to form an indistinct stripe, narrower than pupil diameter, from tip of lower jaw to upper pectoral angle; similar melanophores frequently intrude pale lateral stripe on remainder of body; dark line of melanophores on dorsal margin of lateral stripe obsolete on anterior $\frac{2}{3}$ of body. Color of remaining paratypes similar to that of holotype.

Etymology: The specific name refers to the generally greenish appearance of the type material.

Relationships: The absence of conspicuous color markings separates *Gunnelllichthys viridescens* from all known congeners except *G. irideus* J. L. B. Smith from which it may be distinguished by having a rounded, rather than conspicuously narrowed, snout and lower jaw; a thickened lower lip and deeper lower jaw configuration; short, rather than long pelvic fins; modally 59, rather than 55, vertebrae, and other features. The configuration of the lower lip, irregular spacing of the anterior dorsal spines and short pelvic fins suggest that *viridescens* is most closely related to *G. pleurotaenia* Bleeker, *G. copleyi* J. L. B. Smith and *G. curiosus*.

Remarks: The first three or four segmented dorsal rays, as well as the first anal element, are simple in the largest paratype. The remaining

specimens show a general positive correlation between increased SL and the branching of dorsal and anal segmented fin rays. Incomplete branching of segmented dorsal and anal fin elements, together with a predominance of simple, rather than branched, pelvic fin rays, suggests that none of the type series are fully developed. Larger specimens probably have four branched pelvic fin rays and all segmented dorsal and anal elements branched. Branching of fin rays is an ontogenetic character in microdesmids and, in this species, anal fin elements begin to branch prior to those of the dorsal fin; branching develops first in the posterior fin, then proceeds anteriorly with growth. Adult color patterns develop early in microdesmids (at 20–25 mm SL in some species) and apparently change little with increased size. It is improbable that the color pattern of *G. viridescens* undergoes striking changes in later life.

The presence of labial teeth has not been previously described in microdesmid fishes; probably because of the paucity of study material of many genera and species. Preliminary observations suggest that labial teeth do not occur in the Eastern Atlantic and Western Hemisphere species assemblage presently included in the nominal genus *Microdesmus* Günther.

The occurrence of *Gunnellichthys viridescens* in the Maldive Islands constitutes the first record of the family Microdesmidae in the Eastern Indian Ocean. Discovery of this species in both the Seychelles and Maldives suggests that it may be a common component of the Indian Ocean insular ichthyofauna.

LITERATURE CITED

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